Precalc Warm Up # 1- 4

Show on a number line:

1. $\{x \mid -5 \le x < 4\} \setminus \{0\}$

2. $(-\infty,10) \cap [-2,12]$

3. $(-\infty,10) \cup (-2,12)$

4. Simplify:

a. $\sqrt{50} + 3\sqrt{32}$

b. $\dfrac{\sqrt{3}}{\sqrt{5}-2}$

HW questions?

EXERCISES 2.1 SL p.20

1. Show the following sets on the real number line.

(a) $\{x \mid 2 \le x \le 8\}$ (b) $\{x \mid x > 7\}$ (c) $\{x \mid -2 < x \le 6\} \setminus \{4\}$

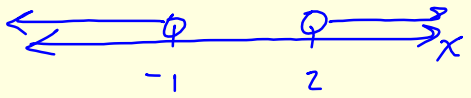
(d) $]2, 7] \cap]4, 8[$ (e) $(-\infty, 4) \cap [-2, 5)$ (f) $\{x : x < -6\}$

2. Write the following using interval notation.

(a) $\{x|-2\le x\le 7\}$ (b) $\{x|x>9\}$

(c) $\{x|0<x\le 5\}$ (d) $\{x:x\le 0\}$

(e) $\{x:x<8\}\cap\{x:x>-4\}$ (f) $\{x:x<-1\}\cup\{x:x>2\}$



$(-\infty,-1)\cup(2,\infty)$

3. Simplify the following.

(a) $3\sqrt{5}+\sqrt{20}$ (b) $2\sqrt{3}-\sqrt{27}$ (c) $\sqrt{2}+\sqrt{3}+\sqrt{8}-\sqrt{18}$

4. Simplify the following.

(a) $(\sqrt{5}+1)(\sqrt{5}-1)$ (b) $(2\sqrt{3}-\sqrt{2})(\sqrt{2}+\sqrt{3})$

(c) $(3\sqrt{2}-\sqrt{6})(\sqrt{3}+3)$ (d) $(2+3\sqrt{3})^2$

$3\sqrt{6}+9\sqrt{2}-\sqrt{18}-3\sqrt{6}$

$9\sqrt{2}-\sqrt{9}\sqrt{2}$

$9\sqrt{2}-3\sqrt{2}$

$6\sqrt{2}$

$(a+b)^2$

$a^2+2ab+b^2$

$(2)^2+2(2)(3\sqrt{3})+(3\sqrt{3})^2$

$4+12\sqrt{3}+9(3)$

5. Rationalise the denominator in each of the following.

(c) $\dfrac{\sqrt{3}}{\sqrt{5}-2}\cdot\dfrac{\sqrt{5}+2}{\sqrt{5}+2}$

(e) $\dfrac{(\sqrt{2}+\sqrt{3})}{\sqrt{3}-\sqrt{5}}\cdot\dfrac{(\sqrt{3}+\sqrt{5})}{\sqrt{3}+\sqrt{5}}=\dfrac{\sqrt{6}+\sqrt{10}+3+\sqrt{15}}{3-5}$

$=-\dfrac{\sqrt{6}+\sqrt{10}+3+\sqrt{15}}{2}$

6.

(b) If $x = 4 + \sqrt{3}$, find the value of i. $x - \frac{1}{x}$ ii. $x^2 + \frac{1}{x^2}$

ii) $(4+\sqrt{3})^2 + \frac{1}{(4+\sqrt{3})^2}$

$16 + 8\sqrt{3} + 3 + \frac{1}{(4+\sqrt{3})^2}$

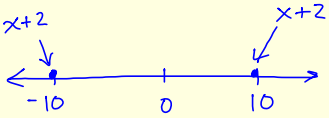
$\frac{19+8\sqrt{3}}{1} + \frac{1}{19+8\sqrt{3}} \cdot \frac{19-8\sqrt{3}}{19-8\sqrt{3}}$

$\frac{169}{169} \cdot \frac{19+8\sqrt{3}}{1} + \frac{19-8\sqrt{3}}{361-192}$

$\frac{3211+1352\sqrt{3}}{169} + \frac{19-8\sqrt{3}}{169}$ put together & simplify.

7. Find the value of x if

(b) $\{x \mid |x| = 10\}$ (c) $\{x \mid |x| = -2\}$ (e) $\{x \mid |x+2| = 10\}$



So: $x+2 = -10$ or $x+2 = 10$

$x = -12$ or $x = 8$

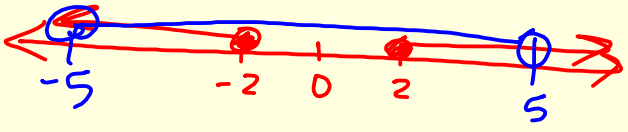
8. Represent each of the following on the real number line.

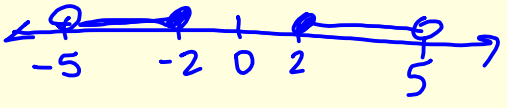
(a) $\{x : |x| \le 5\}$ (b) $\{x \mid |x| > 2\}$

(c) $\{x : 2 \le |x| < 5\}$ (d) $\{x : 2|x| \ge 8\}$

connected statement → intersection

$|x| \ge 2 \cap |x| < 5$





$(-5, -2] \cup [2, 5)$

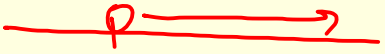
9. Write the following using interval notation.

(a) $\{x \mid x - 1 > 0\}$ (b) $\left\{x \mid \frac{1}{2}x > 2\right\}$ (c) $\{x : x > 4\} \cap \{x : 2x < 12\}$

$x - 1 > 0$

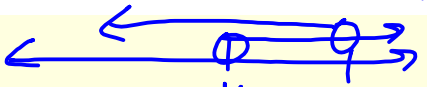
$+1 \quad +1$

$x > 1$



$(1, \infty)$

$x < 6$



$(4, 6)$

Review of Solving Linear Equations

Easy.... $\{x : 5 - 2(x + 5) = 9x - 5\}$

$5 - 2x - 10 = 9x - 5$

$-5 = 11x - 5$

$\frac{0}{11} = \frac{11x}{11}$

$\boxed{x = 0}$

Harder.....

$120\left(\frac{5x}{3} - \frac{1}{8}\right) = \frac{7}{10}(x-2)(120)$

LCD = $3 \cdot 2 \cdot 4 \cdot 5$

120

$200x - 15 = 84(x-2)$

Solving Literal Equations

Solve for b_1 $\quad A = \frac{1}{2}(b_1 + b_2)h$

$2A = (b_1 + b_2)h$

$\frac{2A}{h} = b_1 + b_2$

$b_1 = \frac{2A}{h} - b_2$

Solve for x

$\frac{a}{b-x} \quad \frac{b}{a-x}$

$a^2 - ax = b^2 - bx$

$+ax \qquad +ax$

$a^2 = b^2 + ax - bx$

$a^2 - b^2 = ax - bx$

$\frac{a^2 - b^2}{a-b} = \frac{x(a-b)}{a-b}$

$x = \frac{a^2 - b^2}{a-b}$

$x = \frac{(a+b)(a-b)}{(a-b)}$

$x = a + b$

What happens on this one?

$$2 - 4|x + 1| < 10$$

$-2 \quad -2$

$$-4|x+1| < 8$$

$\div -4 \quad \div -4$

$$|x+1| > -2$$

but all absolute value out comes will be positive (and greater than -2)!

So: $x = \mathbb{R}$ (all real numbers)

Groups:

$$30\left(\frac{x-5}{2} - \frac{x+7}{3}\right) = \frac{4}{5} \cdot 30$$

$$x = \frac{169}{5}$$ 11

LCD $\left(\frac{1}{y-1}+4\right)=\frac{4y}{y+1}$ · LCD

LCD = $(y+1)(y-1)$ or y^2-1

$y+1+4(y^2-1)=4y(y-1)$

$y=\frac{3}{5}$

$4(5-\frac{1}{6}x)=x-10$

$4(5-(1/6)x)-x+10=0$

Equation solving with your grapher.

1. Catalog
2. Solve(, x , guess)
3. Enter an expression that is equal to 0. Put in a comma. Type the variable you wish to solve for. Then make a guess, and your calculator will give you the answer closest to your guess.

Drawbacks: If there is more than one solution, "

If you make a notation error entering your equation, "

This one is tricky!

If you use your previous rules:

$|x| = 2x + 1$

$x = 2x + 1$ or $x = -(2x+1)$

$x = -1$ $\quad$ $x = -\frac{1}{3}$

But one of these is extraneous!

Would it have been a good idea to solve with your grapher?

Solve(2x+1−abs(x),x, guess).

$x = -\frac{1}{3}$

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If you use your previous rules:

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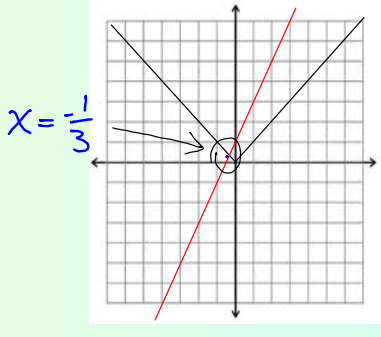
But one of these is extraneous!

Would it have been a good idea to solve with your grapher?

Solve(2x+1−abs(x),x, guess).

OR Graph & find intersection.

$x = -\frac{1}{3}$



HW 1- 4: SL Book

Middle Column

p. 25 #1de, 2-5 MC,

and p. 28 #1-2 MC, 3ab

Group practice, if there's time.

1. $|2x + 4| = 6$

2. $|3 - 4x| \leq 5$

3. $2 + 4|x + 1| > 11$